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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,454	08/31/2001	Steven Verhaverbeke	004936	3536
32588	7590	03/17/2005	USA/ETCH/METAL	
APPLIED MATERIALS, INC. 2881 SCOTT BLVD. M/S 2061 SANTA CLARA, CA 95050			EXAMINER MOORE, KARLA A	
			ART UNIT	PAPER NUMBER
			1763	

DATE MAILED: 03/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/945,454

Applicant(s)

VERHAVERBEKE ET AL.

Examiner

Karla Moore

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11,14-16,18,21,24,25,44,48,49 and 51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11,14-16,18,21,24,25,44,48,49 and 51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 11, 14-16, 18, 21, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,769,952 to Komino in view of U.S. Patent Publication No. 2001/0024691 A1 to Kimura et al. and Japanese Patent Publication No. 06-177093 A to Matsuo et al.

4. Komino discloses an apparatus for atmospheric and sub-atmospheric processing of a wafer in Figure 1, comprising: an atmospheric transfer chamber (20) having a first wafer handler (22) contained therein; a wet cleaning module coupled to said atmospheric transfer chamber (any of chambers 18 A-C; column 6, rows 7-15); a sub-atmospheric transfer chamber (14) having a second wafer handler (16) contained therein; a first load lock chamber (130A) coupled to said sub-atmospheric chamber and to said atmospheric chamber; a second ashing module (10A; column 5, rows 48-59) coupled to said sub-atmospheric transfer; and a first sub-atmospheric processing module coupled to said sub-atmospheric transfer chamber wherein said sub-atmospheric module is selected from the group consisting of a CVD

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deposition module, a sputter module, and oxidation module, and etch module and an anneal module (10B or 10C; column 5, rows 48-59).

5. However, Komino fails to teach the apparatus comprising an integrated particle monitoring module for monitoring particles on a wafer surface coupled to said atmospheric transfer chamber and a controller for controlling said wet cleaning module and said integrated particle monitoring module.

6. Kimura et al. teach the use of a sensor for measuring thickness, detecting the presence of foreign particles or recognition of a pattern formed on a substrate coupled to a transfer chamber (Figure 25; paragraphs 49-51, 88, 312 and 323) for the purpose of utilizing records as data for controlling the treatment time of a subsequent step and as data for judging the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is food or poor.

7. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a integrated particle monitoring module in Komino in order to utilize records as data for controlling the treatment time of a subsequent step and as data to judge the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is food or poor as taught by Kimura.

8. Examiner notes that based on the motivation above, it would have been obvious to one of ordinary skill in the art that coupling a monitor/sensor to any sort of transfer chamber, regardless of the pressure maintained in the transfer chamber would have benefits.

10. Examiner also notes that Komino additionally teaches that the invention is not limited to the particular processing techniques mentioned in the disclosure for either the atmospheric or sub-atmospheric processing modules (column 6, rows 23-35 and column 11, rows 26-34).

11. Komino and Kimura disclose the invention substantially as claimed and as described above.

12. However, Komino and Kimura fail to teach a first ashing module coupled to said atmospheric transfer chamber.

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13. Matsuo teach et al. teach the use of an ashing apparatus that is used at atmospheric pressure for the purpose of improved throughput, reduced cost, etching homogeneity and higher reliability (abstract, JPO and DERWENT).

14. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have carried out an ashing process at atmospheric pressure and to have thus coupled an ashing chamber to the atmospheric transfer chamber in Komino and Kimura in order to achieve increased throughput, reduced cost, etching homogeneity and higher reliability as taught by Matsuo.

15. With respect to claims 14 and 15, said apparatus of Komino further comprises a second load lock (130B) coupled between said atmospheric transfer chamber and said sub-atmospheric chamber. Both the first and second load lock are single wafer load locks (column 7, rows 10-18).

16. With respect to claim 16, a wafer cassette (24 A and 24 B) is coupled to said atmospheric transfer chamber in Komino for providing wafers to be loaded into said atmospheric chamber.

17. With respect to claim 18, as noted above, Komino teaches a first etch module may be coupled to the sub-atmospheric transfer chamber (column 5, rows 48-59). With respect to adding a second etch module, the courts have ruled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). In the instant case, the addition of a second module would obviously lead to increased throughput; this is neither a new result nor an unexpected result.

18. Adding a second ashing module coupled to the atmospheric module would have been obvious for the same reason.

19. With respect to claim 21, as noted above the monitoring apparatus may also be a CD measurement tool/sensor for recognition of a pattern formed on a substrate or a sensor for measuring thickness (paragraph 88).

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20. With respect to claims 24 and 25, as noted above, Kimura teaches control of subsequent processing based on results from the monitoring tool which are recorded in a recording means/controller (paragraphs 49-51).

21. Claims 44, 48-49 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,769,952 to Komino in view of U.S. Patent Publication No. 2001/0024691 A1 to Kimura et al.

22. Komino discloses an apparatus for atmospheric and sub-atmospheric processing of a wafer in Figure 1, comprising: an atmospheric transfer chamber (20) having a first wafer handler (22) contained therein; a wet cleaning module coupled to said atmospheric transfer chamber (any of chambers 18 A-C; column 6, rows 7-15); a sub-atmospheric transfer chamber (14) having a second wafer handler (16) contained therein; a first load lock chamber (130A) coupled to said sub-atmospheric chamber and to said atmospheric chamber; a wet cleaning module (any of chambers 18 A-C; column 6, rows 7-15) coupled to the atmospheric transfer module; a single wafer thermal process module (in any of chambers 10 A-C; column 7, rows 25-28) coupled to said sub-atmospheric transfer chamber; and a first sub-atmospheric processing module capable of polysilicon deposition (in any of chambers 10 A-C; column 7, rows 25-28) coupled to said sub-atmospheric transfer chamber.

23. However, Komino fails to teach the apparatus comprising an integrated particle monitoring module for monitoring particles on a wafer surface coupled to said atmospheric transfer chamber and a controller for controlling said wet cleaning module and said integrated particle monitoring module.

24. Kimura et al. teach the use of a sensor for measuring thickness, detecting the presence of foreign particles or recognition of a pattern formed on a substrate coupled to a transfer chamber (Figure 25; paragraphs 49-51, 88, 312 and 323) for the purpose of utilizing records as data for controlling the treatment time of a subsequent step and as data for judging the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is good or poor. Kimura et al. teach various apparatus configurations where a sensor is placed in different locations, for instance in a transferring hand attached to a transfer chamber (S, Figures 34A and B) or in a separate chamber attached to a transfer chamber (Figure 25, 405).

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25. It would have been obvious to one of ordinary skill in the art at the time the Applicant's invention was made to have provided a integrated particle monitoring module in Komino in order to utilize records as data for controlling the treatment time of a subsequent step and as data to judge the good or poor state of each treatment step or whether after completion of substrate processing whether the substrate is good or poor as taught by Kimura. It would have been further obvious to use one of the sensors as a thickness measuring sensor and the other as a foreign particle sensor in order to judge the state of a wafer with respect to both of these parameters as taught by Kimura et al.

26. Examiner notes that based on the motivation above, it would have been obvious to one of ordinary skill in the art that coupling a monitor/sensor to any sort of transfer chamber, regardless of the pressure maintained in the transfer chamber would have benefits.

27. Examiner also notes that Komino additionally teaches that the invention is not limited to the particular processing techniques mentioned in the disclosure for either the atmospheric or sub-atmospheric processing modules (column 6, rows 23-35 and column 11, rows 26-34).

28. Additionally with respect to the recitation that provides for the controller to control the silicon deposition chamber, the thermal process chamber and the wet cleaning chamber, as noted above, the controller can be used to control any subsequent process. In a cluster tool, which is typically designed so that numerous processing sequences can be executed, each of the chambers would necessarily be controlled by the computer, so that in a processing sequence/intended use where processing in any of these chambers takes place after a wet cleaning step—the processing may be modified as needed based on the results of an integrated particle monitor as taught in Kimura.

29. While Komino does not teach deposition of polysilicon in any of the sub-atmospheric chambers they would be capable of depositing polysilicon and this seen as an intended use. The courts have ruled that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). The courts have also ruled that expressions relating the apparatus to contents

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thereof during an intended operation are of no significance in determining patentability of the apparatus claim. Ex parte Thibault, 164 USPQ 666, 667 (Bd. App. 1969).

30. With respect to claim 48, as noted above, Komino teaches a first single wafer thermal process module may be coupled to the sub-atmospheric transfer chamber (column 5, rows 48-59). With respect to adding a second single wafer thermal process module, the courts have ruled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960). In the instant case, the addition of a second module would obviously lead to increased throughput; this is neither a new result nor an unexpected result.

31. With respect to claim 49, as noted above, in Komino, the first and second load locks are coupled between the sub-atmospheric transfer chamber and atmospheric transfer chamber.

32. With respect to claim 51, as noted above Kimura teaches control of subsequent processing based on results from the monitoring section which are recorded in a recording means/controller (paragraphs 49-51).

### ***Response to Arguments***

33. Applicant's arguments filed 12/29/04 have been fully considered but they are not persuasive.

34. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Admittedly, Matsuo does not teach an ashing chamber coupled to an atmospheric transfer chamber, what Matsuo teaches is the benefits/advantages of performing ashing at atmospheric pressure. Komino teaches: 1) providing a combined reduced and normal pressure apparatus, thus enabling improved treatment quality and throughput (column 3, rows 13-21); 2) coupling reduced pressure processing chambers to one another using a reduced pressure transfer chamber and coupling normal pressure processing chambers to one another using a normal pressure processing chamber (column 5, rows 23-28 and column 5, rows 60-67); and 3) providing alternative



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constructions based on the type of treatment required in the intended/desired semiconductor manufacturing method (column 6, rows 23-27 and column 11, rows 26-34). Based on the combined teachings of Komino and Matsuo it would have been obvious to one of ordinary skill in the art that by providing an ashing chamber attached to the atmospheric transfer chamber (because the process is performed at atmospheric pressure) one would achieve the improved quality and throughput discussed in both of the references.

35. With respect to Applicant's argument that Kimura et al. disclose a single monitoring tool, Examiner does not agree. Kimura et al. disclose numerous embodiments, where monitoring apparatus are placed in different positions. It would have been obvious to take advantage of the different types of monitoring tools in order to monitor different aspects of the treatment provided for the wafer as noted above. Further, providing two of the sensors disclosed in Kimura et al. (which could be capable of monitoring thickness or the presence of foreign particles) could also be considered duplication of parts and the courts have ruled that the mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

### ***Conclusion***

36. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USP 6,633,132 to Yoo teaches an ashing chamber coupled to an atmospheric transferring chamber.

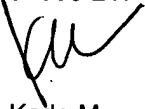
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 8:30am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on 571.272.1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC)

at 866-217-9197 (toll-free).



Karla Moore  
Art Unit 1763  
March 10, 2005